10070948 .052102

JC20 Rec'd PCT/PTO 13 MAR 2002

TRANSMITTAL LETTER OT THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		Attorney Docket No. **4301-1002** U.S. Application No. 10/070948
INTERNATIONAL APPLN. NO. **PCT/AT00/00246**	INTERNATIONAL FILING DATE **14 September 2000**	PRIORITY DATE CLAIMED **14 September 1999**

TITLE OF INVENTION: **METHOD AND DEVICE FOR TEMPERING FORM TOOLS OF INJECTION MOULDING MACHINES**

APPLICANT(S) FOR DE/EO/US: **WERNER WITTMANN**

Applicant herewith submits to the United States Designated Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau)
   b. ☐ has been communicated by the International Bureau. See attached PCT/IB/308.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2))
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made, however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☒ Information Disclosure Statement (IDS) w/PTO-1449 - ☐ Copy of IDS citations
12. ☐ Assignment Papers (cover sheet & document(s))
13. ☒ A FIRST Preliminary Amendment.
14. ☐ A SECOND or SUBSEQUENT Preliminary Amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application (35 U.S.C. 154(d)(4)).
20. ☒ Other items or information: **Abstract on a separate sheet, Application Data Sheet, International Preliminary Examination Report (PCT/IPEA/409)**

U.S. APPLICATION NO. 10/070948	INTERNATIONAL APPLN. NO. PCT/AT00/00246	ATTORNEY DOCKET NO. 4301-1002

21. ☒ The following fees are submitted:

	CALCULATIONS PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1)-(5):	
Neither international preliminary examination fee nor international search fee paid to USPTO and international Search Report not prepared by the EPO or JPO $1040.00	
International preliminary examination fee not paid to USPTO but International Search Report prepared by the EPO or JPO $890.00	
International preliminary examination fee not paid to USPTO but International search fee paid to USPTO $740.00	
International preliminary examination fee paid to USPTO but all claims did not satisfy provision of PCT Article 33 (1)-(4) $710.00	
International preliminary examination fee paid to USPTO and all claims satisfied provision of PCT Article 33 (1)-(4) $100.00	
ENTER APPROPRIATE BASIC FEE AMOUNT	$ 890.00
Surcharge of $130.00 for furnishing the oath or declaration than ☐ 20- ☒ 30 Months from the earliest claimed priority date (37 CFR 1.492(e))	$ 130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total Claims	15 - 20 =	0	X $18.00	$
Independent Claims	2 - 3 =	0	X $84.00	$
MULTIPLE DEPEND CLAIM(S) (if applicable)			+ $280.00	$
			TOTAL OF ABOVE CALCULATION -	$ **1,020.00**
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.			+	$
			SUBTOTAL =	$ 1,020.00
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492Z(f)).				$
			TOTAL NATIONAL FEE =	$ 1,020.00
Fee for recording the enclosed assigned (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) $40.00 per property +				$
			TOTAL FEES ENCLOSED -	$ 1,020.00
			Amount to be refunded:	$
			Charged:	$

☒ A Check in the amount of **$1,020.00** to cover all fees is attached.

☐ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to Deposit account No. 25-0120 in the name of Young & Thompson, as described below. A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fee required under 37 C.F.R. §§ 1.16 or 1.17.

SEND ALL CORRESPONDENCE TO:
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Y&T Customer No. 000466

00466
PATENT .TRADEMARK OFFICE

BC/lmt
Date: **13 March 2002**

SIGNATURE Benoit Castel

Benoit Castel
NAME

35,041
REGISTRATION NO.

PATENT
4301-1002

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of: Werner WITTMANN

Appl. No.: **NEW NATIONAL PHASE APPLICATION IN THE UNITED STATES** Group:

Filed: March 13, 2002 Examiner:

For: METHOD AND DEVICE FOR TEMPERING FORM TOOLS OF INJECTION MOULDING MACHINES

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, DC 20231

March 13, 2002

Sir:

Prior to the first Official Action and calculation of the filing fee, the following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

IN THE ABSTRACT OF THE DISCLOSURE:

Please add the Abstract of the Disclosure attached on a separate sheet attached hereto.

IN THE CLAIMS:

Please amend the claims as follows:

Docket No. 4301-1002

--3. (amended) Process as claimed in claim 1, wherein the discharge temperature of each line (4a, 4b) of the mold tool (1) is acquired.--

--4 (amended) Process as claimed in one of claim 1, wherein the temperature control medium is water which is supplied to the supply line (1) from a water line (12).--

--6. (amended) Process as claimed in claim 1, wherein the temperature control medium in the supply line (2) is heated when necessary, preferably during the heat-up phase before the start of production, using a flow heater (3).--

--7. (amended) Process as claimed in claim 6, wherein the temperature control medium is delivered intermittently during the heat-up phase.--

--8. (amended) Process for temperature control of mold tools (1) of injection molding machines for CD production as claimed in claim 1, wherein the valves (7, 8) are closed after receiving a start signal from the injection molding machine and are opened again after an adjustable delay time.

--11. (amended) Device as claimed in claim 9, wherein one valve (7, 8) is assigned to each line (4a, 4b) in the mold tool.--

--12. (amended) Device as claimed in claim 9, wherein there is a flow heater (3) in the supply line (2).--

--14. (amended) Device as claimed in claim 9, wherein there are temperature sensors (5, 6) in the lines (4a, 4b) in or following the mold tool (1).--

--15. (amended) Device for production of CD blanks as claimed in claim 9, wherein it has an adjustable time delay element which controls the closing time of the valves (7, 8).--

REMARKS

Claims 3,4, 6, 8, 11, 12, 14, and 15 have been amended to eliminate multiple dependencies.

The above changes in the claims merely place this national phase application in the same condition as it was during Chapter II of the international phase, with the multiple dependencies being removed.

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The

attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON

Benoit Castel

Benoit Castel, Reg. No. 35,041

745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297

BC:lmt
Attachments

Docket No. 4301-1002

ABSTRACT OF THE DISCLOSURE

A method and a device for tempering form tools of injection molding machines. A tempering medium coming from a supply line flows through lines in the form tool and is carried away through a discharge pipe. The tempering medium is discharged by valves. An essentially more constant march of pressure pertaining to the tempering medium can be obtained during the production cycle when the pressure in the supply line is constant and when valves for clocking, i.e. the interruption or resumption of the flow of the tempering medium through the form tool, are only provided after the form tool as seen in the direction of flow. The more constant march of pressure can be obtained because the lines in the form tool are not entirely closed but stay open on the side which pertains to the supply line.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

3. Process as claimed in claim 1~~ or 2~~, wherein the discharge temperature of each line (4a, 4b) of the mold tool (1) is acquired.

4. Process as claimed in one of ~~claims 1 to 3,~~claim 1, wherein the temperature control medium is water which is supplied to the supply line (1) from a water line (12).

6. Process as claimed in ~~one of claims 1 to 5,~~claim 1, wherein the temperature control medium in the supply line (2) is heated when necessary, preferably during the heat-up phase before the start of production, using a flow heater (3).

7. Process as claimed in claim 6, wherein the temperature control medium is delivered intermittently during the heat-up phase.

8. Process for temperature control of mold tools (1) of injection molding machines for CD production as claimed in ~~one of claims 1 to 7,~~claim 1, wherein the valves (7, 8) are closed after receiving a start signal from the injection molding machine and are opened again after an adjustable delay time.

11. Device as claimed in claim 9~~ or 10~~, wherein one valve (7, 8) is assigned to each line (4a, 4b) in the mold tool.

12. Device as claimed in ~~one of claims 9 to 12,~~claim 9, wherein there is a flow heater (3) in the supply line (2).

14. Device as claimed in ~~one of claims 9 to 13,~~claim 9, wherein there are temperature sensors (5, 6) in the lines (4a, 4b) in or following the mold tool (1).

15. Device for production of CD blanks as claimed in ~~one of claims 9 to 14,~~claim 9, wherein it has an adjustable time delay element which controls the closing time of the valves (7, 8).

METHOD AND DEVICE FOR TEMPERING FORM TOOLS OF INJECTION MOULDING MACHINES

The invention relates to a process for temperature control of mold tools of injection molding machines in which the temperature control medium flows from a supply line through lines in the mold tool and is drained through a discharge line, and in which the flow of the temperature control medium is controlled by means of valves.

The invention relates furthermore to a device for control of the temperature control of mold tools of an injection molding machine with a supply line, lines in the mold tool and a discharge line, as well as valves for controlling the flow of the temperature control medium through the mold tool.

The temperature control of mold tools is generally rather complex, especially in the production of CD blanks, since on the one hand during production large amounts of heat must be dissipated; this requires a large amount of coolant. Furthermore, in many cases, especially in the production of CD blanks, the flow of coolant in certain phases of the production cycle must be interrupted; this imposes high demands on the technical structure of the temperature control circuit or its control, since the pressure in the temperature control circuit may not drop, in order to ensure reliable and uniform cooling of the mold or the production material.

The prior art discloses, for example, reference being made to DE-U 88 04 394, providing valves in both the feed line and also the return line in order to cycle the flow of the temperature control medium through the mold tool.

The disadvantage in the devices of the prior art has been found to be that constant pressure conditions are not established in the mold tool by providing the control valves in front of and

following the mold tools, but the pressure of the temperature control medium is subject to major fluctuations due to the opening and closing of the valves.

Therefore the object of the invention is to make available a process and a device with which uniform pressure behavior of the temperature control medium can be achieved during the production cycle.

This object is achieved with a process with the features of claim 1.

This object is furthermore achieved with a device with the features of claim 8.

It has been found that when, viewed in the flow direction, there are valves following the mold tool for cycling, i.e. for interrupting or restarting the flow of the temperature control medium through the mold tool, a much more uniform pressure behavior of the temperature control medium can be achieved during the production process, since the lines in the mold tool are not completely closed, but on one side, on the supply line, they remain open; this of course assumes that the pressure in the supply line remains constant after closing of the valves.

Furthermore, using either combined cooling and heating devices to heat or cool the temperature control medium when necessary or providing separate feed lines in which there is one heating device and one cooling device each, are known.

It has been found especially disadvantageous that cooling means for the temperature control medium are necessary which, depending on the required cooling performance, are associated with considerable procurement costs as well as maintenance and service costs. Attempts have therefore already been made to meet the cooling water demands from a water line; this would be

very economical, but has failed to date because in the techniques used so far for cycle control, i.e. for blocking the lines in front of and behind the mold tool, satisfactory pressure and flow or temperature conditions cannot be achieved.

In this invention in which the lines are blocked as controlled by valves exclusively following the mold tool, there are the major advantages that not only a simple water line connection for supply of the coolant can be used - thus a cooling device can be abandoned, but that also extremely constant pressure conditions prevail during opening and closing of the valves due to the open connection to the water line.

But since of course both the pressure and also the temperature of the local water line can fluctuate, it is possible on the one hand to take into account the altered conditions by changing the cycle times for temperature control in the production cycle.

It is preferred in the invention when the pressure in the supply line is controlled depending on the connection pressure and/or the connection temperature of the water of the water line via a pressure reduction valve.

The pressure in the lines in the mold tool can be controlled on the one hand by the pressure reduction valve. On the other hand, the pressure reduction valve can also control the amount of delivery of water/unit of time through the mold tool, by which also the different supply temperatures of the water from the local water line can be taken into account by increasing the amount of delivery/unit of time at higher supply temperatures.

Since individual mold plates of the mold tool can have different coolant demand and this coolant demand can be considered among others by different cycle times in the cooling of the mold plates, it is provided in the development of the invention that one valve is assigned to each line in the mold tool.

In this way the coolant demand in each line of a mold plate of the mold tool can be individually controlled or cycled.

At the start of the production process it is necessary to heat the mold tools first to the operating temperature. For this reason, in the supply line there can be a flow heater. To be able to make this flow heater as small as possible, in one development of the invention it can be provided that the temperature control medium is delivered intermittently during the heat-up phase.

By interrupting the flow of the temperature control medium through the flow heater during the heat-up phase, the temperature control medium is heated to a higher temperature so that the mold tool can also be heated more rapidly. But conversely of course at a stipulated heat-up time which is dictated for example by the time necessary for plastification of the material to be processed, the flow heater can be made smaller than would be possible in the prior art and without cycled operation of the flow heater.

Other preferred embodiments of the invention are the subject of the other dependent claims.

One preferred embodiment of the invention is explained below with reference to the attached drawings.

As is roughly shown in schematic form in the drawings, one supply line 2 with a flow heater 3 leads to a mold tool 1. The supply line 2 in this embodiment branches into two lines 2a, 2b which lead to two mold plates of the mold tool 1 which are not shown separately in the drawings. A discharge line 4 leads away from the mold tool 1 and into it in turn two lines 4a, 4b of the mold plates of the mold tool 1 are brought together. In the flow direction towards the mold plates of the mold tool 1 there

are two temperature sensors 5, 6 with which the temperature of the temperature control medium is monitored and possible deviations from setpoints in the control are taken into account.

In lines 4a, 4b there are furthermore controllable check valves 7 and 8 with which the flow of the temperature control medium through the lines 2a, 2b and 4a, 4b in the mold tool 1 can be interrupted independently of one another.

In the supply line 2 there is furthermore a controllable pressure reduction valve 9. Finally, an overpressure valve 10 is connected to the supply line 2.

The supply line 2 is connected to a local water line 12; this is shown for example by the valve 13.

At the start of the production process, the mold tool 1 must first be heated to the operating temperature, for which the flow heater 3 is turned on.

The valves 7 and 8 are closed and the valve 13 is opened. After a temperature sensor 11 which is assigned to the flow heater 3 indicates that a stipulated temperature has been reached, the valves 7 and 8 are opened until the lines in the mold tool 1 are filled with heated water. Then the valves 7 and 8 are closed again, whereupon the water in the mold tool 1 delivers its heat to the mold tool 1 and in the flow heater 3 water is heated again. After the water has reached the stipulated temperature again, the valves 7 and 8 are opened again until the mold tool 1 is filled again with heated water. This process is repeated until the temperature sensors 5, 6 on the discharge-side end of the mold tool 1 display a temperature which indicates sufficient heating of the mold tool 1.

The flow heater 3 is now turned off and the production process is now begun with a first cycle in which cold water is supplied

to the mold tool 1 via the supply line 2. Depending on the special requirements which depend on the type of injection molding to be produced, the valves 7 and 8 are closed, for example during the injection process of the production material into the mold tool 1, the water pressure remaining constant by the open connection to the water line 12. After a certain time which likewise depends again on the type of product to be produced, the valves 7 and 8 are opened and cooling water flows through the mold tool 1 until the mold or the injection molding is sufficiently cooled and it is ejected from the mold tool, whereupon a new production cycle begins.

Generally the injection molding produced in the first cycle will not have the required quality. Due to the outstanding cooling of the mold tool 1 by the measures of this invention the second cycle will however often deliver acceptable injection moldings.

Since both the connection pressure of the water line 12 and also the water temperature can fluctuate, in the supply line 12 there is an adjustable pressure reduction valve 9 by which the pressure and as a result also the amount of delivery per unit of time can be matched to the respective circumstances and requirements.

Whether the set cycle times of the valves 7 and 8 and the adjustment of the pressure reduction valve 9 correspond to the respective requirements is checked by means of the temperature sensors 5 and 6, and deviations from the stipulated setpoints can be considered by changing the cycle times of the valves 7, 8, but preferably by changing the adjustment of the pressure reduction valve 9.

In the production of CD blanks the cooling cycle can be synchronized as follows for example with the injection cycle.

The injection molding machine delivers a START signal (which depending on the injection molding machine corresponds either to the signal "close tool" or "open tool"), whereupon the valves 7, 8 are closed. While the production material is injected into the mold tool 1, the valves 7, 8 remain closed during a preset delay time. This delay time depends primarily on the type of injection molding to be produced and its material, but also on the supply temperature of the water and the water pressure. After the delay time which can be for example 2.2 s for the valve 7 and 2 s for the valve 8, in a CD blank, has expired, the valves 7, 8 are opened again and cooling water flows through the mold tool 1. When the delay time is set, with respect to the supply pressure and the supply temperature of the cooling water it must be watched that the remaining time after opening of the valves is sufficient, that at a given supply temperature and amount of delivery/unit of time which has been set on the pressure reduction valve provisions are made for sufficient cooling of the mold tool 1, but at the same time precise molding of the CD blank in the mold cavity is ensured.

The valves 7, 8 then remain open for 1.4 and 1.6 s for example until the START signal comes again from the injection molding machine and the valves 7, 8 are closed again. In the production of the CD blanks the cycle time in the described example is therefore a total of 3.6 s.

Claims

1. Process for temperature control of mold tools (1) of injection molding machines, in which the temperature control medium flows from a supply line (2) through lines (2a, 2b, 4a, 4b) in the mold tool (1) and is drained through a discharge line (4), and in which the flow of the temperature control medium is controlled by means of valves (7, 8), characterized in that the flow of the temperature control medium is cycled exclusively by opening and closing of valves (7, 8) which are located following the mold tool (1) viewed in the flow direction.

2. Process as claimed in claim 1, wherein the flow of water through each line (2a, 4a; 2b, 4b) of the mold tool is cycled separately.

3. Process as claimed in claim 1 or 2, wherein the discharge temperature of each line (4a, 4b) of the mold tool (1) is acquired.

4. Process as claimed in one of claims 1 to 3, wherein the temperature control medium is water which is supplied to the supply line (1) from a water line (12).

5. Process as claimed in claim 4, wherein the pressure in the supply line (2) is controlled via a pressure reduction valve (9) depending on the connection pressure and/or the connection temperature of the water of the water line (12).

6. Process as claimed in one of claims 1 to 5, wherein the temperature control medium in the supply line (2) is heated when necessary, preferably during the heat-up phase before the start of production, using a flow heater (3).

7. Process as claimed in claim, wherein the temperature control medium is delivered intermittently during the heat-up phase.

8. Process for temperature control of mold tools (1) of injection molding machines for CD production as claimed in one of claims 1 to 7, wherein the valves (7, 8) are closed after receiving a start signal from the injection molding machine and are opened again after an adjustable delay time.

9. Device for controlling the temperature control of mold tools (1) of an injection molding machine with a supply line (2), lines (2a, 2b, 4a, 4b) in the mold tool (1) and a discharge line (4) as well as valves (7, 8) for control of the flow of the temperature control medium through the mold tool, wherein there are valves (7, 8) exclusively in the flow direction following the lines (2a, 2b, 4a, 4b) in the mold tool (1) for cycling of the flow.

10 Device as claimed in claim 9, wherein the supply line (2) is connected to a water line (12) and in the supply line (2) there is a pressure reduction valve (9).

11. Device as claimed in claim 9 or 10, wherein one valve (7, 8) is assigned to each line (4a, 4b) in the mold tool.

12. Device as claimed in one of claims 9 to 12, wherein there is a flow heater (3) in the supply line (2).

13. Device as claimed in claim 12, wherein a temperature sensor (11) is assigned to the continuous heater (3).

14. Device as claimed in one of claims 9 to 13, wherein there are temperature sensors (5, 6) in the lines (4a, 4b) in or following the mold tool (1).

15. Device for production of CD blanks as claimed in one of claims 9 to 14, wherein it has an adjustable time delay element which controls the closing time of the valves (7, 8).

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
Internationales Büro

(43) Internationales Veröffentlichungsdatum
22. März 2001 (22.03.2001)

PCT

(10) Internationale Veröffentlichungsnummer
WO 01/19590 A1

(51) Internationale Patentklassifikation[7]: B29C 45/73

(21) Internationales Aktenzeichen: PCT/AT00/00246

(22) Internationales Anmeldedatum:
14. September 2000 (14.09.2000)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
GM 627/99 14. September 1999 (14.09.1999) AT

(71) Anmelder *(für alle Bestimmungsstaaten mit Ausnahme von US)*: **WITTMANN KUNSTSTOFFGERÄTE GESELLSCHAFT M.B.H.** [AT/AT]; Lichtblaustrasse 10, A-1220 Wien (AT).

(72) Erfinder; und

(75) Erfinder/Anmelder *(nur für US)*: **WITTMANN, Werner** [AT/AT]; Bellevuestrasse 23, A-1190 Wien (AT).

(74) Anwälte: **BEER, Manfred** usw.; Lindengasse 8, A-1070 Wien (AT).

(81) Bestimmungsstaaten *(national)*: CN, JP, SG, US.

(84) Bestimmungsstaaten *(regional)*: europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Veröffentlicht:

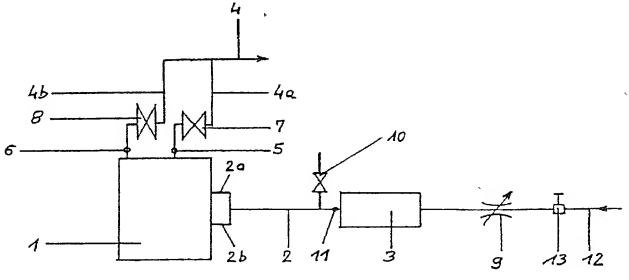
— *Mit internationalem Recherchenbericht.*

— *Vor Ablauf der für Änderungen der Ansprüche geltenden Frist; Veröffentlichung wird wiederholt, falls Änderungen eintreffen.*

[Fortsetzung auf der nächsten Seite]

(54) **Title:** METHOD AND DEVICE FOR TEMPERING FORM TOOLS OF INJECTION MOULDING MACHINES

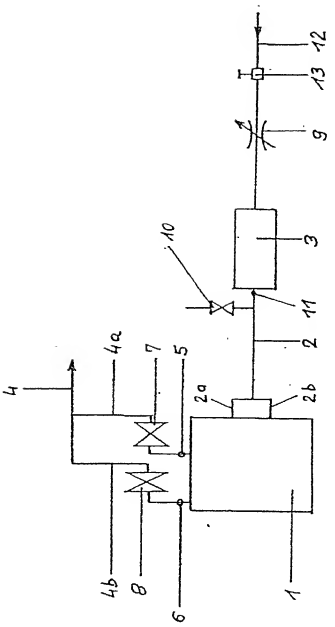
(54) **Bezeichnung:** VERFAHREN UND VORRICHTUNG ZUM TEMPERIEREN VON FORMWERKZEUGEN VON SPRITZGUSSMASCHINEN



(57) **Abstract:** The invention relates to a method and a device for tempering form tools (1) of injection moulding machines. A tempering medium coming from a supply line (2) flows through lines (2a, 2b, 4a, 4b) in the from tool (1) and is carried away through a discharge pipe (4). The tempering medium is discharged by means of valves (7, 8). An essentially more constant march of pressure pertaining to the tempering medium can be obtained during the production cycle when the pressure in the supply line (2) is constant and when valves (7, 8) for clocking, i.e. the interruption or resumption of the flow of the tempering medium through the form tool (1), are only provided after the form tool (1) as seen in the direction of flow. Said more constant march of pressure can be obtained because the lines in the form tool are not entirely closed but stay open on the side which pertains to the supply line (2).

[Fortsetzung auf der nächsten Seite]

WO 01/19590 A1


12
13
9
3
10
11
2
4a
7
5
4
2a
2b
4b
8
6
1

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: METHOD AND DEVICE FOR TEMPERING FORM TOOLS OF INJECTION MOULDING MACHINES

the specification of which: *(check one)*

REGULAR OR DESIGN APPLICATION

☐ is attached hereto.

☐ was filed on _____ as application Serial No. _____

and was amended on _____ (if applicable).

PCT FILED APPLICATION ENTERING NATIONAL STAGE

☒ was described and claimed in International application No. PCT/AT00/00246 filed on September 14, 2000 and as amended on _____(if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

PRIORITY CLAIM

I hereby claim foreign priority benefits under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

Country	Application Number	Date of Filing (day, month, year)	Priority Claimed
AUSTRIA	GM 627/99	14 September 1999	Yes

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional patent application(s) listed below:

Application No.	Filing Date	Status (patented, pending abandoned)

(Complete this part only if this is a continuing application.)

I hereby claim the benefit under 35 USC 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Application No.	Filing Date	Status (patented, pending abandoned)

Docket No. 4301-1002

POWER OF ATTORNEY

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from **BEER & PARTNER PATENTWALTE KEG** as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the registered patent attorneys represented by Customer No. **000466** to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, including: **Robert J. PATCH, Reg. No. 17,355, Andrew J. PATCH, Reg. No. 32,925, Robert F. HARGEST, Reg. No. 25,590, Benoît CASTEL, Reg. No. 35,041, Thomas W. PERKINS, Reg. No. 33,027, Roland E. LONG, Jr., Reg. No. 41,949, and Eric JENSEN, Reg. No. 37,855,**

Customer No. 004466

c/o YOUNG & THOMPSON,
Second Floor,
745 South 23rd Street,
Arlington, Virginia 22202.

Address all telephone calls to Young & Thompson at 703/521-2297. Telefax: 703/685-0573.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor: Werner WITTMANN

Inventor's signature: _____ Date: March 16, 2002

Residence: Wien, Austria Citizenship: Austrian

Post Office Address: Bellevuestrasse 23, A-1190 Wien, Austria

Full name of second joint inventor, if any: _____

Inventor's signature: _____ Date: _____

Residence: _____ Citizenship: _____

Post Office Address: _____

Full name of third joint inventor, if any: _____

Inventor's signature: _____ Date: _____

Residence: _____ Citizenship: _____

Post Office Address: _____

Full name of fourth joint inventor, if any: _____

Inventor's signature: _____ Date: _____

Residence: _____ Citizenship: _____

Post Office Address: _____